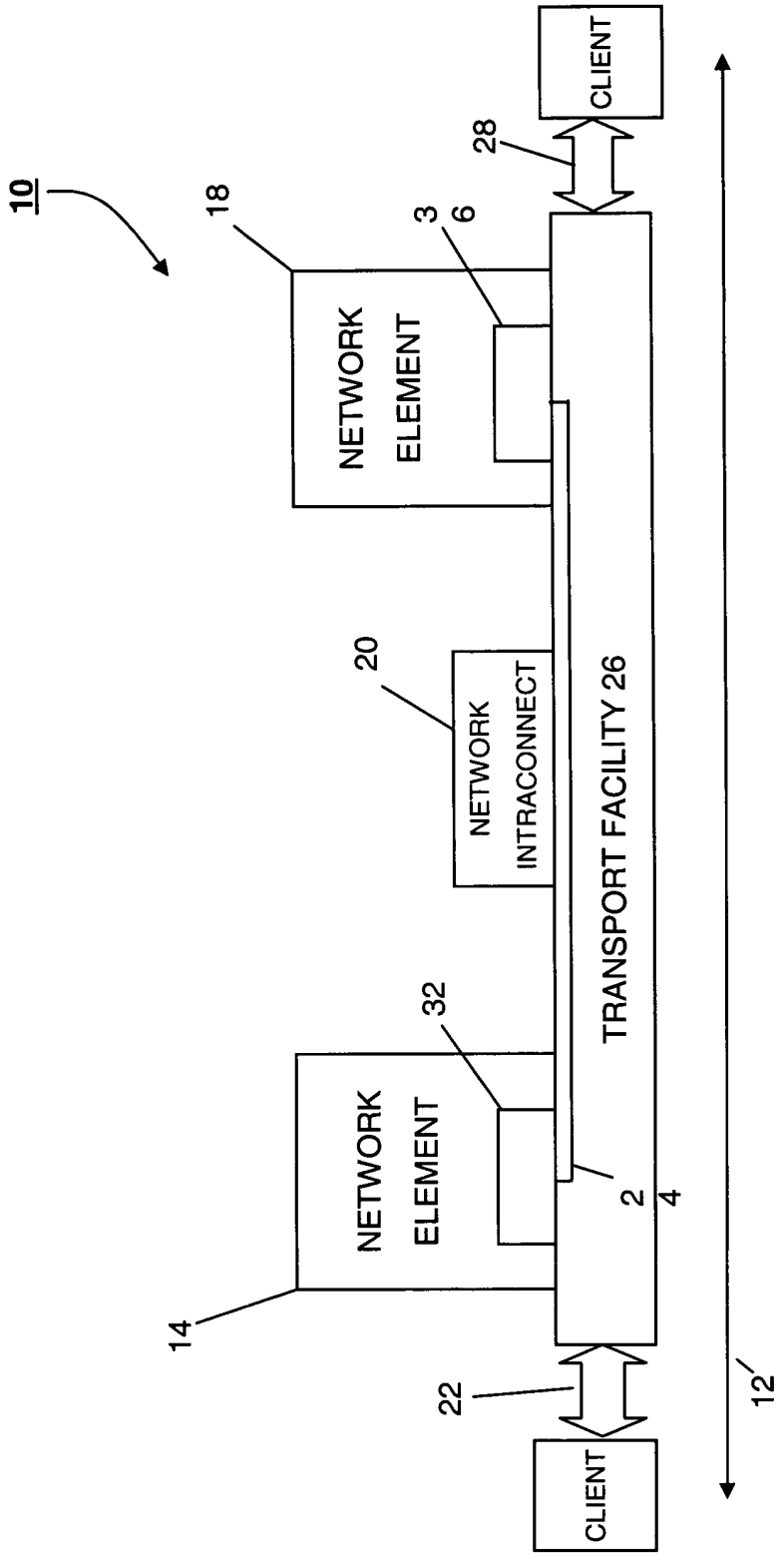
10
18
3
6
28
CLIENT
NETWORK ELEMENT
20
NETWORK INTRACONNECT
TRANSPORT FACILITY 26
32
NETWORK ELEMENT
2
4
14
22
CLIENT
12

FIG. 1

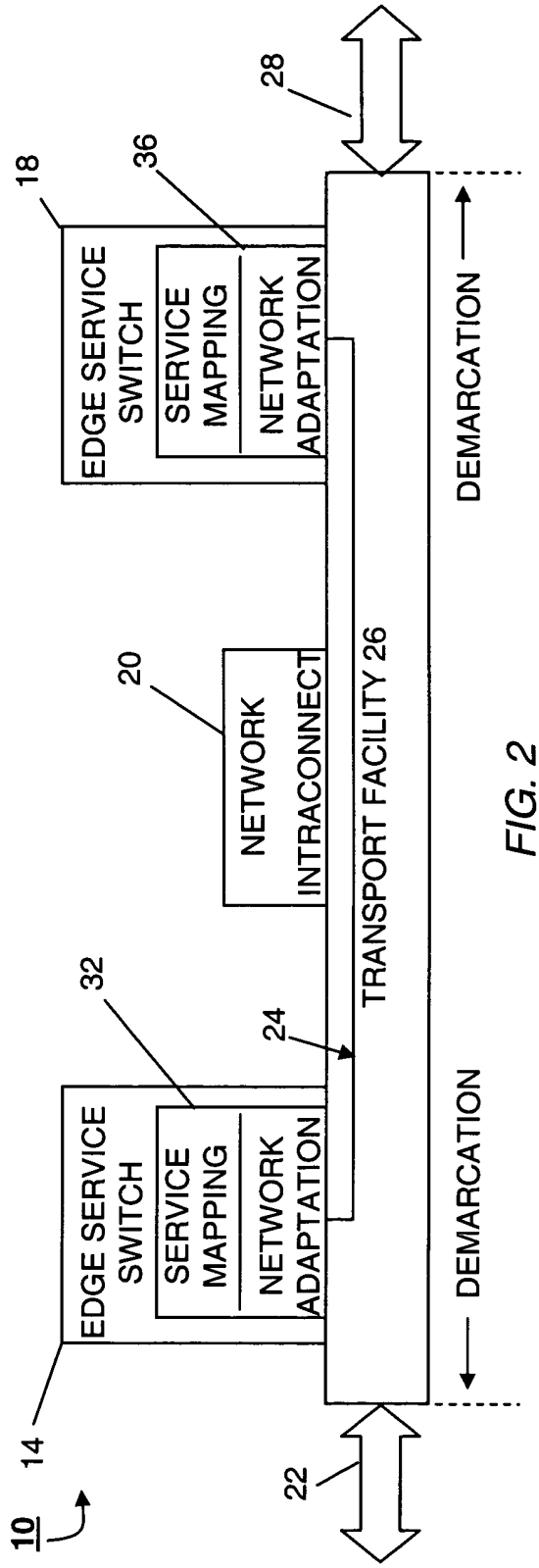
10
14
18
EDGE SERVICE SWITCH
SERVICE MAPPING
NETWORK ADAPTATION
36
28
20
NETWORK INTRACONNECT
32
24
TRANSPORT FACILITY 26
DEMARCATION
DEMARCATION
22

FIG. 2

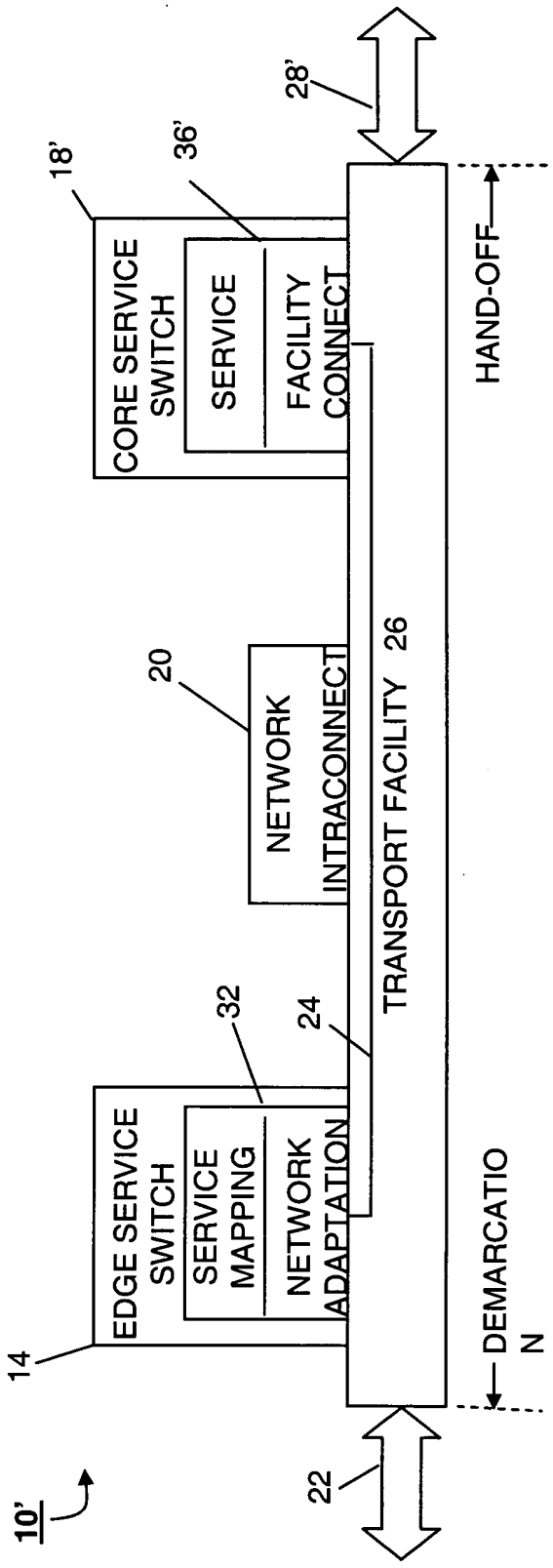
10'
14
18'
CORE SERVICE SWITCH
SERVICE
FACILITY CONNECT
36'
28'
20
NETWORK INTRACONNECT
32
24
TRANSPORT FACILITY 26
HAND-OFF
EDGE SERVICE SWITCH
SERVICE MAPPING
NETWORK ADAPTATION
DEMARCATIO N
22

FIG. 3

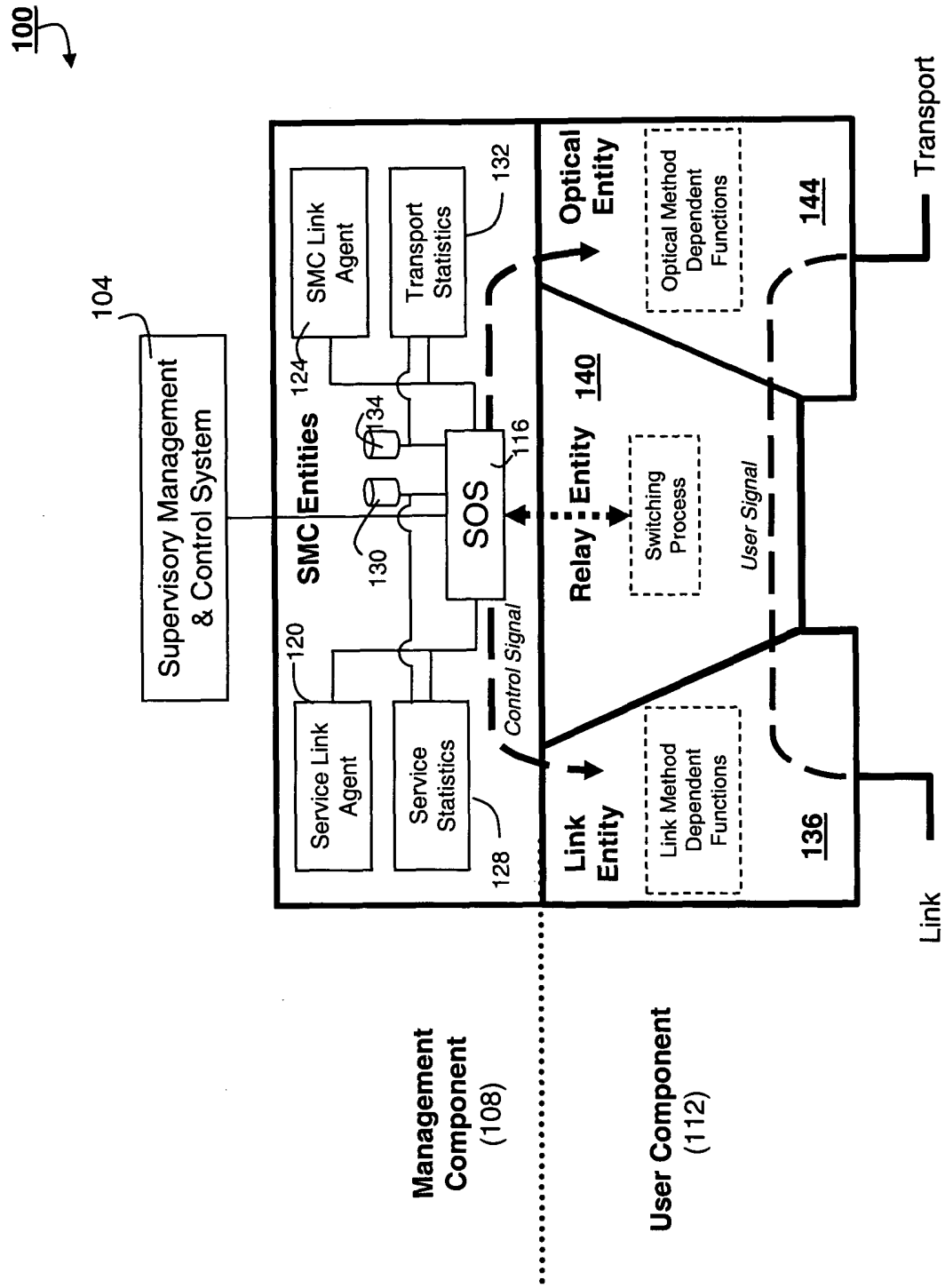
100
104
Supervisory Management & Control System
SMC Entities
SMC Link Agent
Transport Statistics
132
124
134
130
SOS
116
120
Service Link Agent
Service Statistics
128
Control Signal
Optical Entity
Optical Method Dependent Functions
144
Relay Entity
140
Switching Process
User Signal
Link Entity
Link Method Dependent Functions
136
Transport
Link
Management Component (108)
User Component (112)

FIG. 4

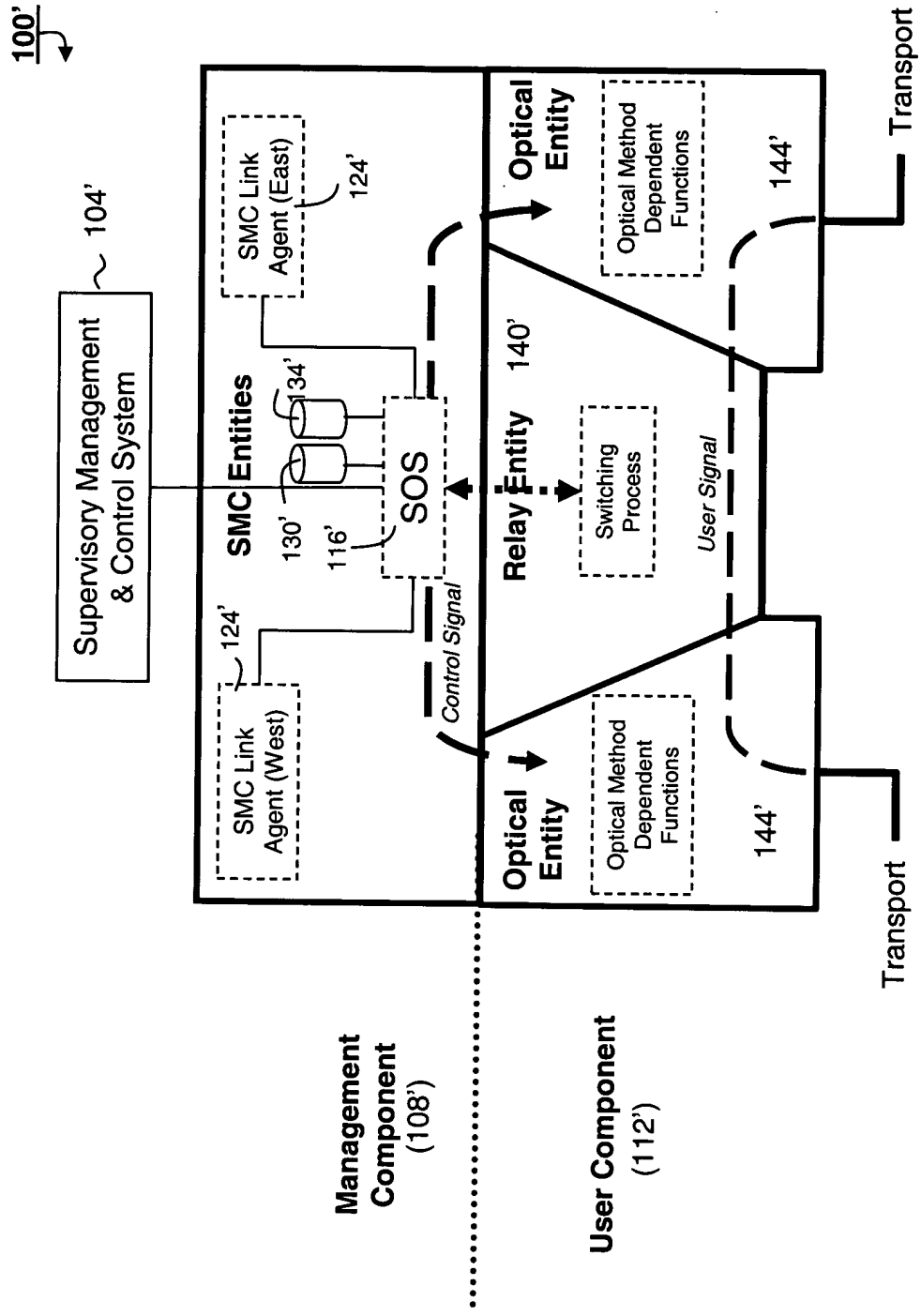
100'
104'
Supervisory Management & Control System
SMC Entities
SMC Link Agent (East)
124'
SMC Link Agent (West)
124'
130'
116'
34'
SOS
Control Signal
Relay Entity
140'
Switching Process
User Signal
Optical Entity
Optical Method Dependent Functions
144'
Transport
Optical Entity
Optical Method Dependent Functions
144'
Transport
Management Component (108')
User Component (112')

FIG. 5

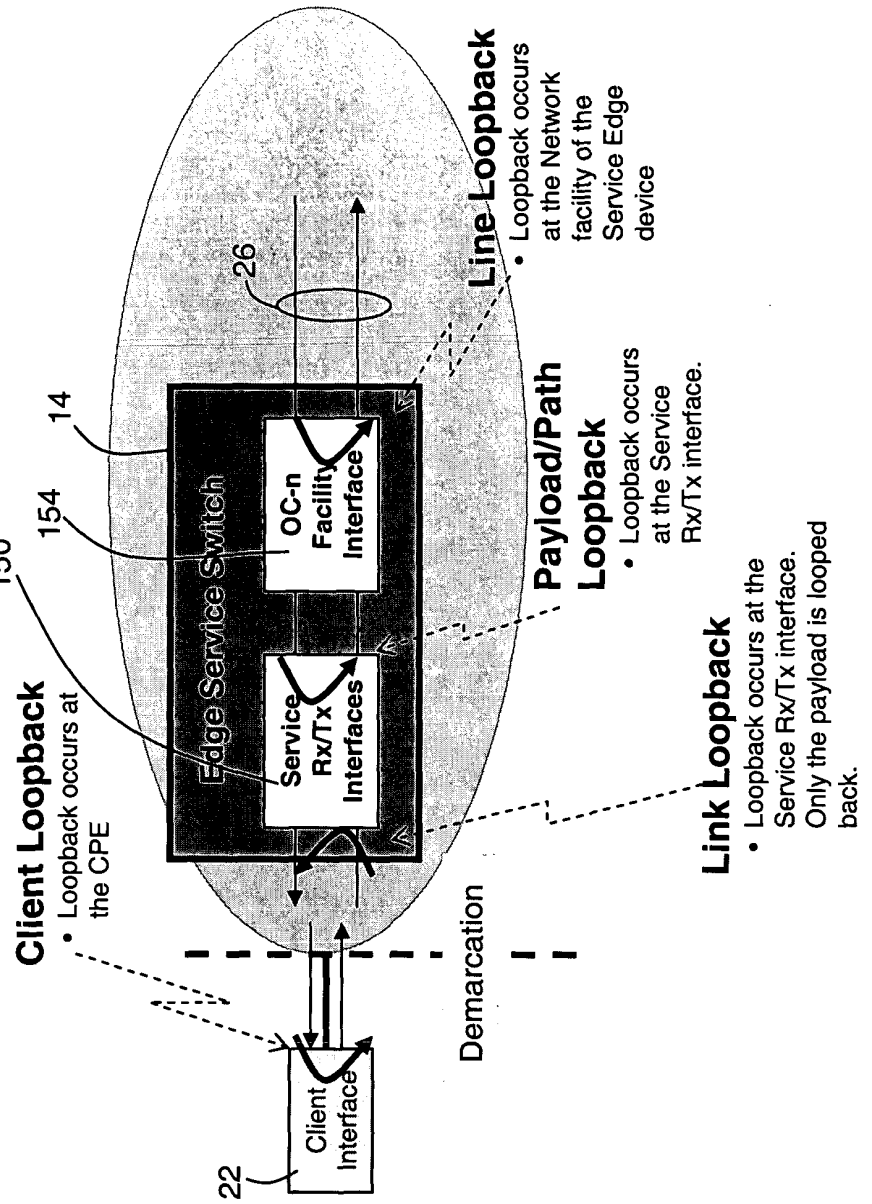
Client Loopback
• Loopback occurs at the CPE
150
Edge Service Switch
14
154
OC-n Facility Interface
Service Rx/Tx Interfaces
26
Line Loopback
• Loopback occurs at the Network facility of the Service Edge device
Payload/Path Loopback
• Loopback occurs at the Service Rx/Tx interface.
Link Loopback
• Loopback occurs at the Service Rx/Tx interface. Only the payload is looped back.
Demarcation
Client Interface
22

FIG. 6

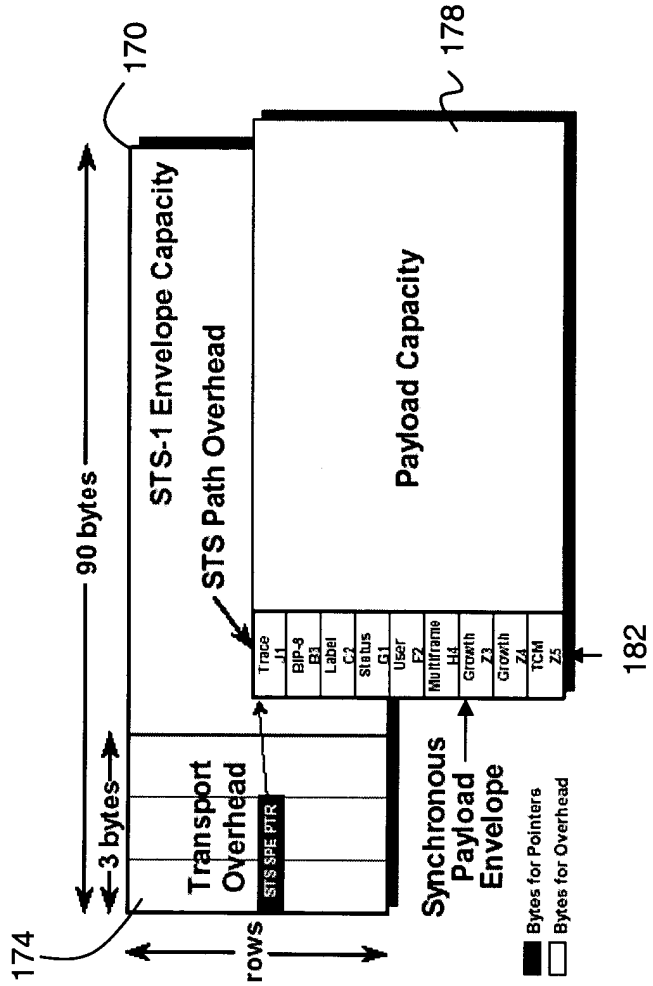
170
178
90 bytes
3 bytes
STS-1 Envelope Capacity
STS Path Overhead
Payload Capacity
Trace J1
BIP-8 B3
Label C2
Status G1
User F2
Multiframe H4
Growth Z3
Growth Z4
TCM Z5
182
Transport Overhead
STS SPE PTR
Synchronous Payload Envelope
Bytes for Pointers
Bytes for Overhead
174
9 rows

FIG. 7

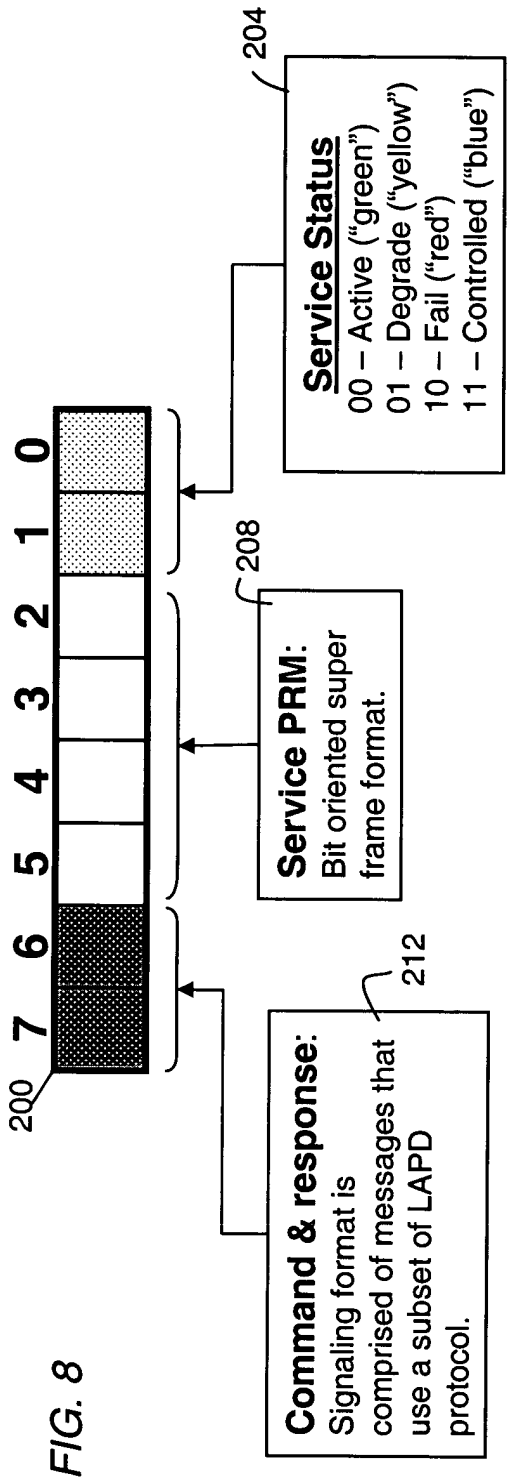
204
Service Status
00 – Active ("green")
01 – Degrade ("yellow")
10 – Fail ("red")
11 – Controlled ("blue")
208
Service PRM:
Bit oriented super frame format.
7 6 5 4 3 2 1 0
200
212
Command & response:
Signaling format is comprised of messages that use a subset of LAPD protocol.

FIG. 8

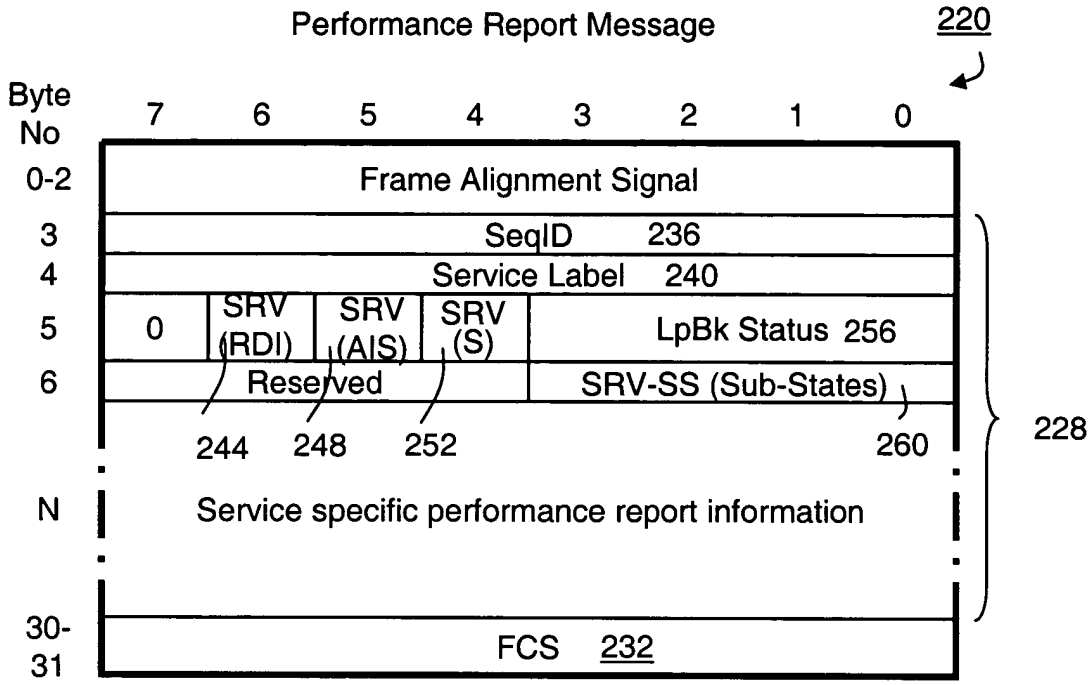
Performance Report Message
220
Byte No
7 6 5 4 3 2 1 0
0-2
Frame Alignment Signal
3
SeqID 236
4
Service Label 240
5
0
SRV (RDI)
SRV (AIS)
SRV (S)
LpBk Status 256
6
Reserved
SRV-SS (Sub-States)
244
248
252
260
228
N
Service specific performance report information
30-31
FCS 232

FIG. 9

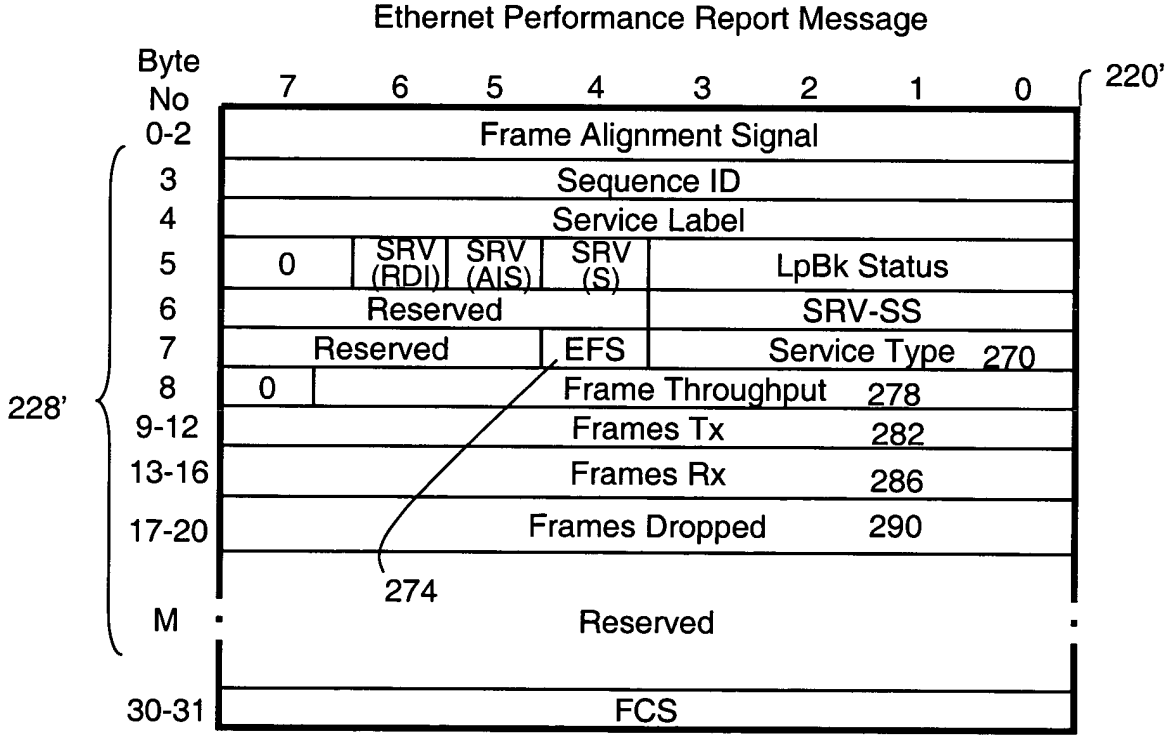
Ethernet Performance Report Message
Byte No
7 6 5 4 3 2 1 0
220'
0-2
Frame Alignment Signal
3
Sequence ID
4
Service Label
5
0
SRV (RDI)
SRV (AIS)
SRV (S)
LpBk Status
6
Reserved
SRV-SS
7
Reserved
EFS
Service Type 270
8
0
Frame Throughput 278
9-12
Frames Tx 282
13-16
Frames Rx 286
17-20
Frames Dropped 290
228'
274
M
Reserved
30-31
FCS

FIG. 10

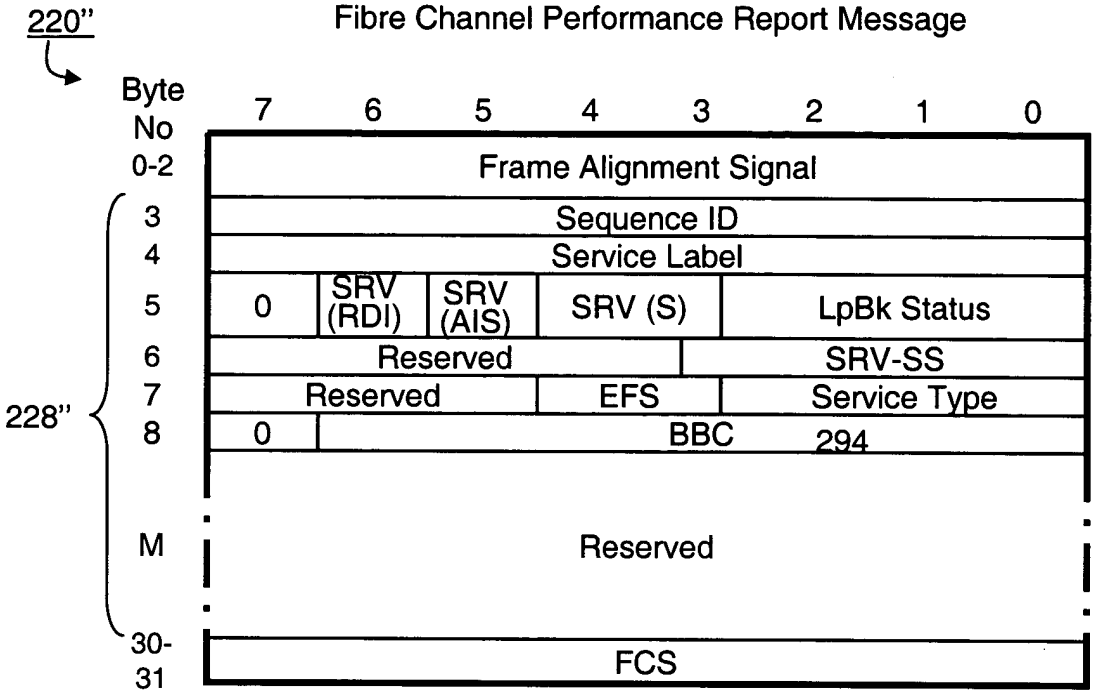
220"
Fibre Channel Performance Report Message
Byte No
7 6 5 4 3 2 1 0
0-2
Frame Alignment Signal
3
Sequence ID
4
Service Label
5
0
SRV (RDI)
SRV (AIS)
SRV (S)
LpBk Status
6
Reserved
SRV-SS
7
Reserved
EFS
Service Type
228"
8
0
BBC 294
M
Reserved
30-31
FCS

FIG. 11

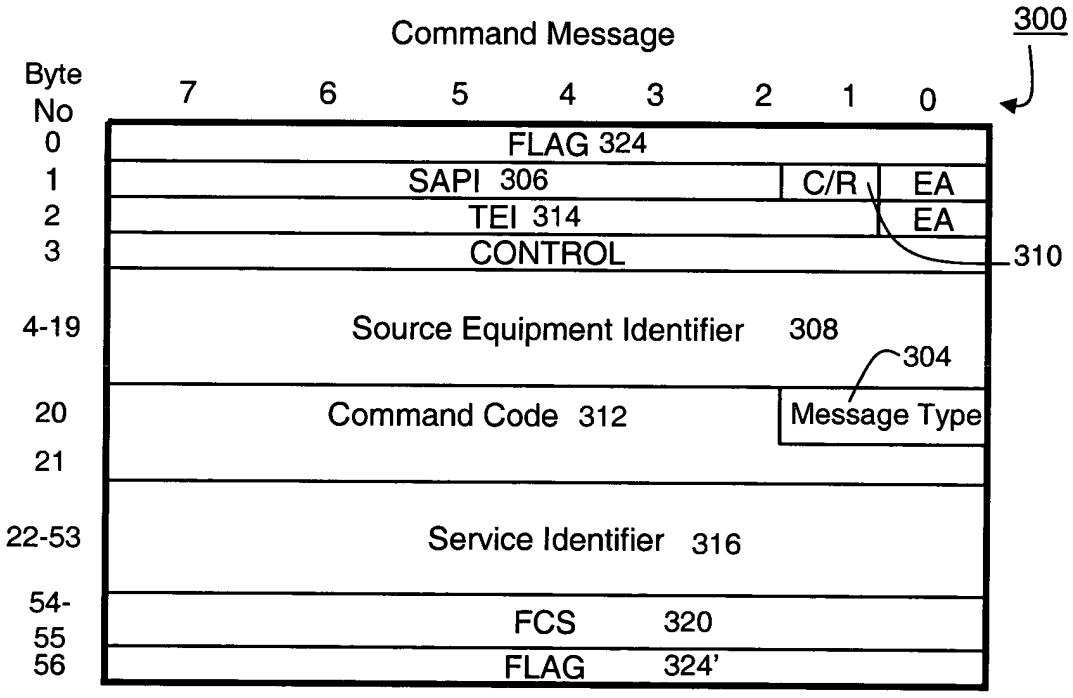
Command Message
300
Byte No
7 6 5 4 3 2 1 0
0
FLAG 324
1
SAPI 306
C/R
EA
2
TEI 314
EA
3
CONTROL
310
4-19
Source Equipment Identifier 308
304
20
Command Code 312
Message Type
21
22-53
Service Identifier 316
54-55
FCS 320
56
FLAG 324'

FIG. 12

Ethernet Service Report (330)

Byte No	7	6	5	4	3	2	1	0
0	FLAG							
1	SAPI						C/R	EA
2	TEI							EA
3	CONTROL							
4-19	Destination Equipment Identifier (DEI)							
20-51	Service Identifier							
52	Reserved			Service Type			Message Type	
53	Rate Status			LpBk Status			SS	
54	Reserved			Duplexity Status			Pause Status	
55-56	Committed Information Rate							
57-58	Peak Information Rate							
59							Unit	
60	Burst Duration							
61-62	FCS							
63	FLAG							

FIG. 13

Fibre Channel Service Report (340)

Byte No	7	6	5	4	3	2	1	0
0	FLAG							
1	SAPI						C/R	EA
2	TEI							EA
3	CONTROL							
4-19	Destination Equipment Identifier							
20-51	Service Identifier							
52	Reserved			Service Type			Message Type	
53	Rate Status 342			Lpbak Status				SRV-S
54	Provisioned Buffer Credits 346							
55-56	FCS							
57	FLAG							

FIG. 14

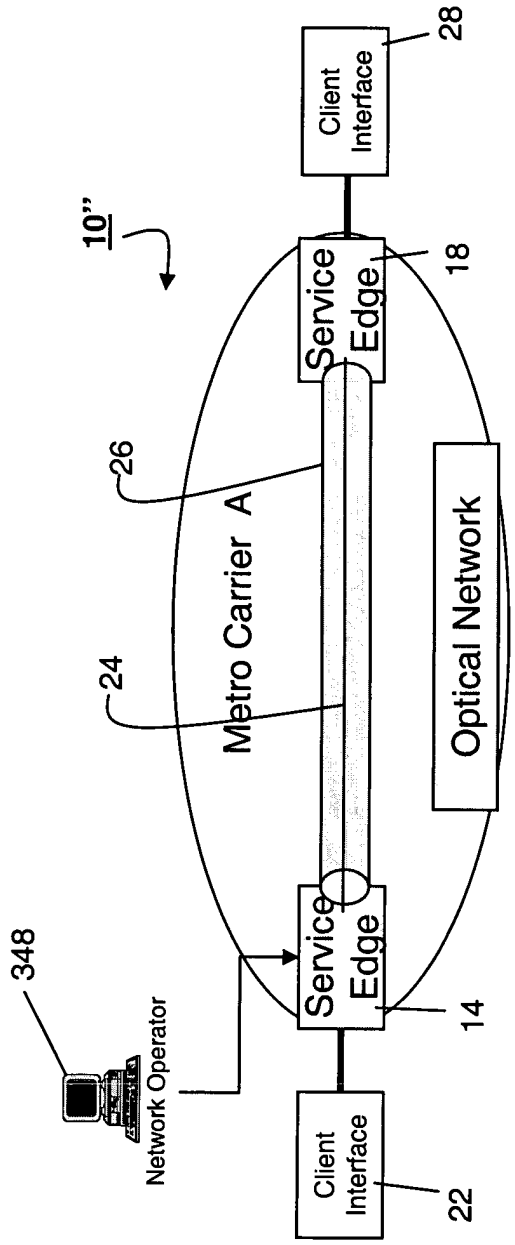
10''
Client Interface
28
Service Edge
18
26
Metro Carrier A
24
Optical Network
348
Network Operator
Service Edge
14
Client Interface
22

FIG. 15

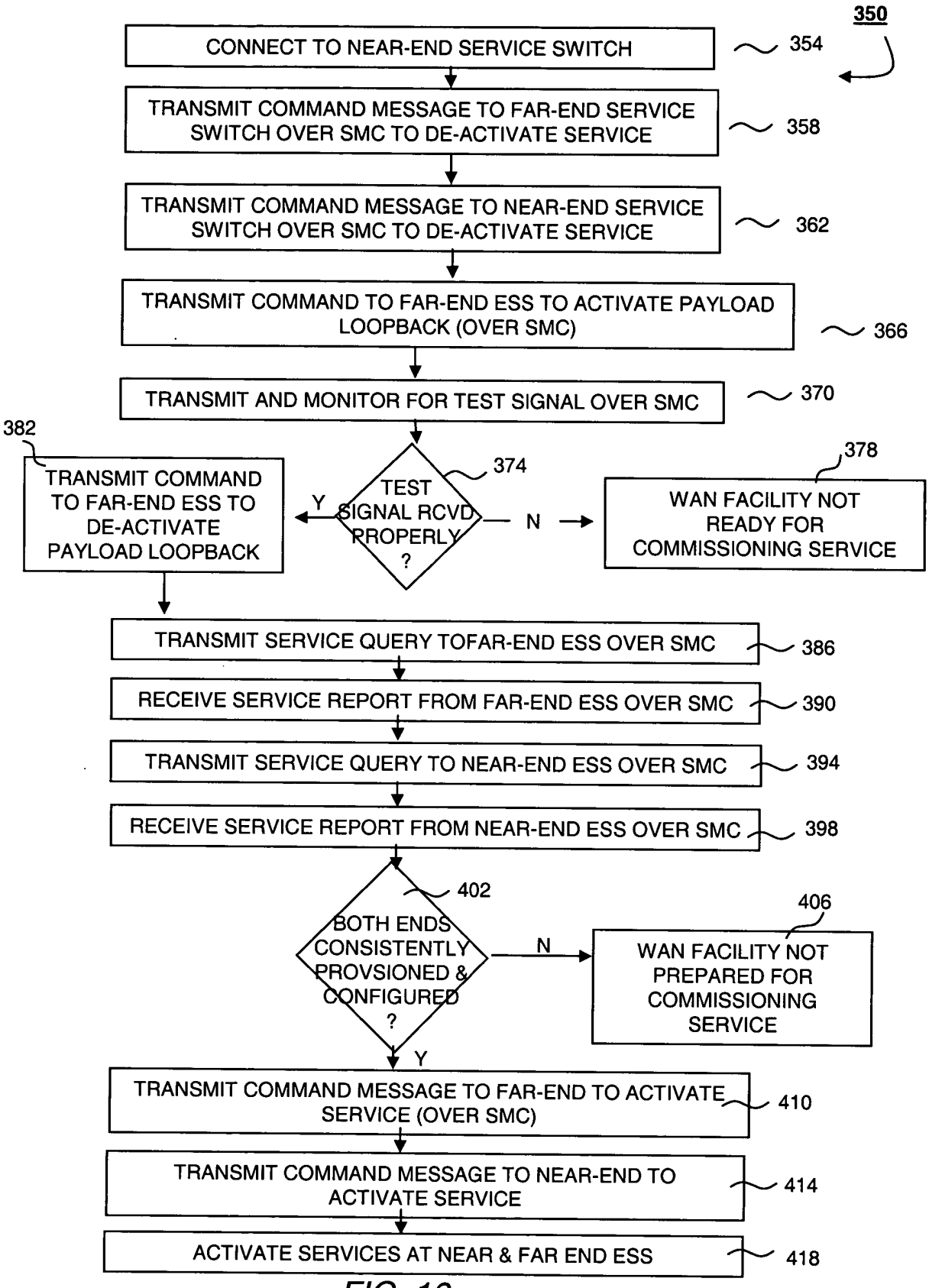
350
CONNECT TO NEAR-END SERVICE SWITCH
354
TRANSMIT COMMAND MESSAGE TO FAR-END SERVICE SWITCH OVER SMC TO DE-ACTIVATE SERVICE
358
TRANSMIT COMMAND MESSAGE TO NEAR-END SERVICE SWITCH OVER SMC TO DE-ACTIVATE SERVICE
362
TRANSMIT COMMAND TO FAR-END ESS TO ACTIVATE PAYLOAD LOOPBACK (OVER SMC)
366
TRANSMIT AND MONITOR FOR TEST SIGNAL OVER SMC
370
382
TRANSMIT COMMAND TO FAR-END ESS TO DE-ACTIVATE PAYLOAD LOOPBACK
374
TEST SIGNAL RCVD PROPERLY ?
Y
N
378
WAN FACILITY NOT READY FOR COMMISSIONING SERVICE
TRANSMIT SERVICE QUERY TOFAR-END ESS OVER SMC
386
RECEIVE SERVICE REPORT FROM FAR-END ESS OVER SMC
390
TRANSMIT SERVICE QUERY TO NEAR-END ESS OVER SMC
394
RECEIVE SERVICE REPORT FROM NEAR-END ESS OVER SMC
398
402
BOTH ENDS CONSISTENTLY PROVSIONED & CONFIGURED ?
N
406
WAN FACILITY NOT PREPARED FOR COMMISSIONING SERVICE
Y
TRANSMIT COMMAND MESSAGE TO FAR-END TO ACTIVATE SERVICE (OVER SMC)
410
TRANSMIT COMMAND MESSAGE TO NEAR-END TO ACTIVATE SERVICE
414
ACTIVATE SERVICES AT NEAR & FAR END ESS
418

FIG. 16

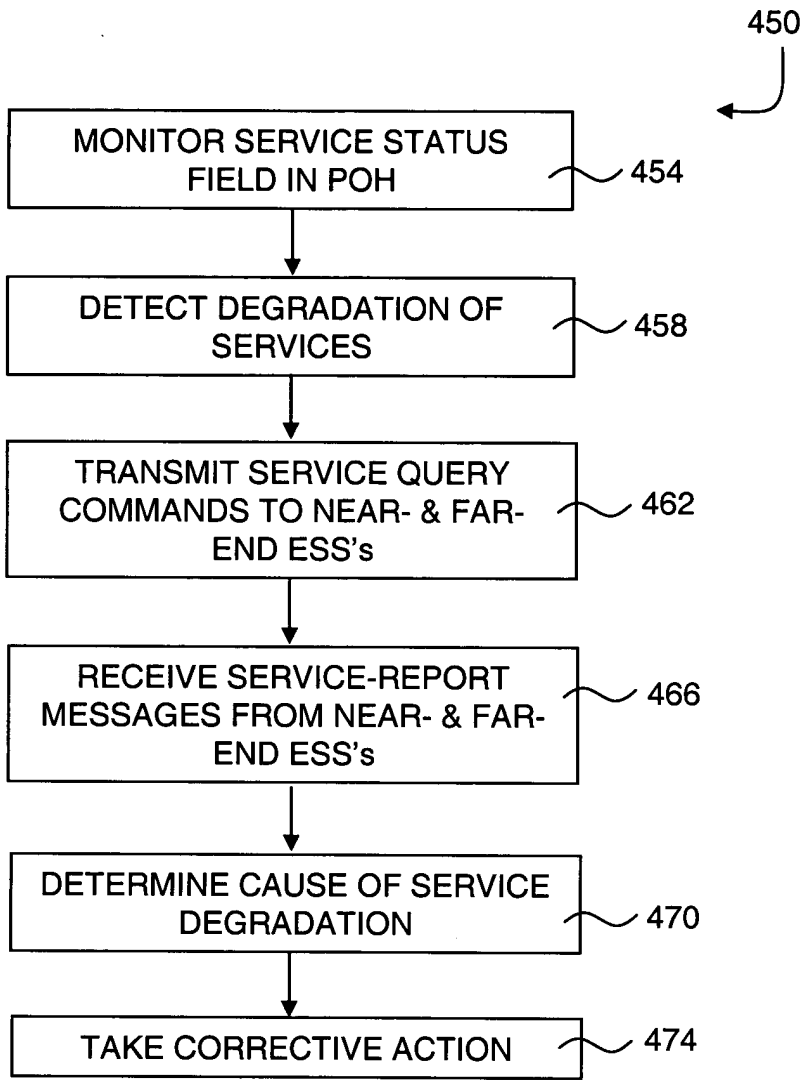
450
MONITOR SERVICE STATUS FIELD IN POH
454
DETECT DEGRADATION OF SERVICES
458
TRANSMIT SERVICE QUERY COMMANDS TO NEAR- & FAR-END ESS's
462
RECEIVE SERVICE-REPORT MESSAGES FROM NEAR- & FAR-END ESS's
466
DETERMINE CAUSE OF SERVICE DEGRADATION
470
TAKE CORRECTIVE ACTION
474

FIG. 17

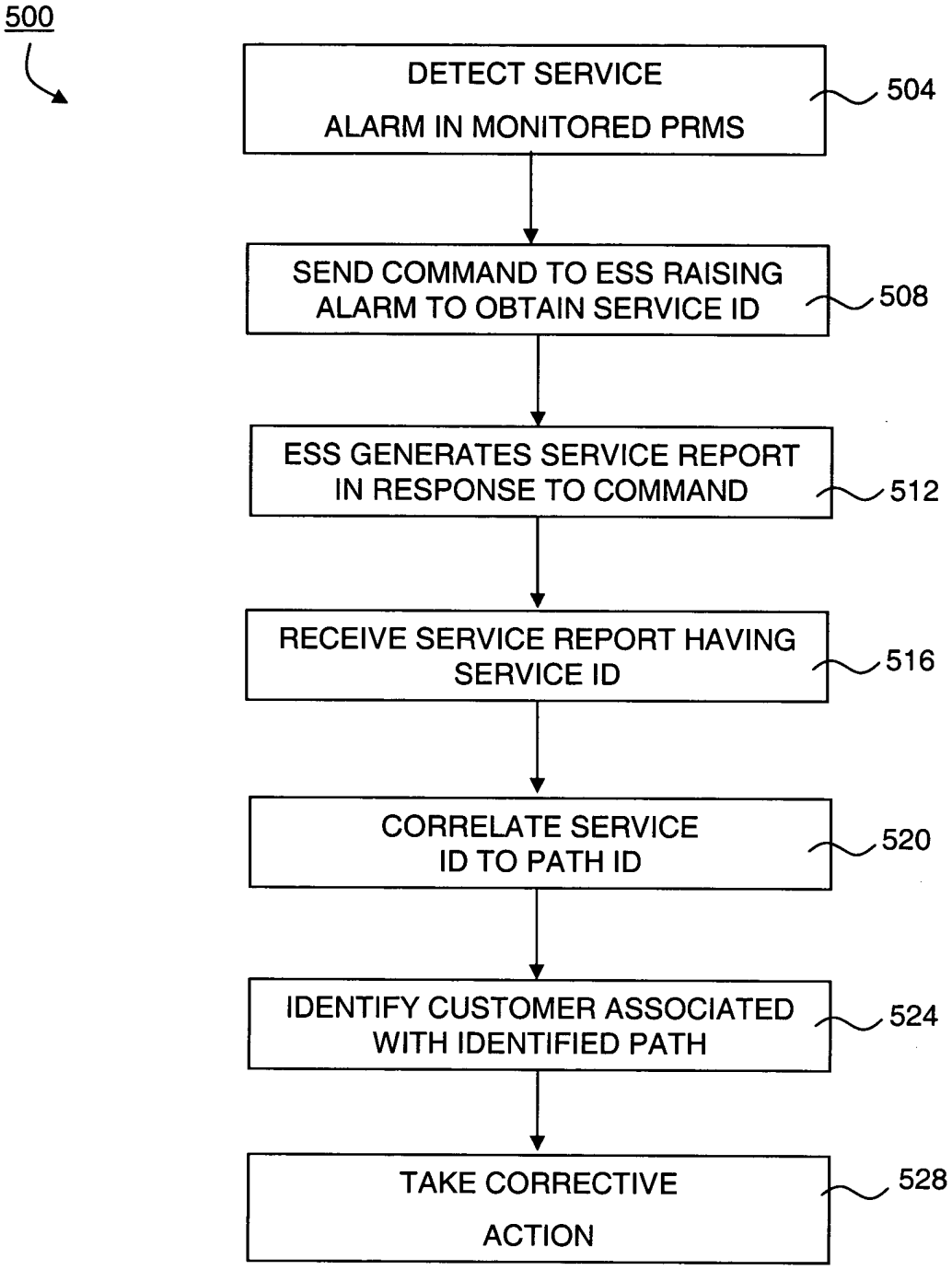
500
DETECT SERVICE ALARM IN MONITORED PRMS
504
SEND COMMAND TO ESS RAISING ALARM TO OBTAIN SERVICE ID
508
ESS GENERATES SERVICE REPORT IN RESPONSE TO COMMAND
512
RECEIVE SERVICE REPORT HAVING SERVICE ID
516
CORRELATE SERVICE ID TO PATH ID
520
IDENTIFY CUSTOMER ASSOCIATED WITH IDENTIFIED PATH
524
TAKE CORRECTIVE ACTION
528

FIG. 18

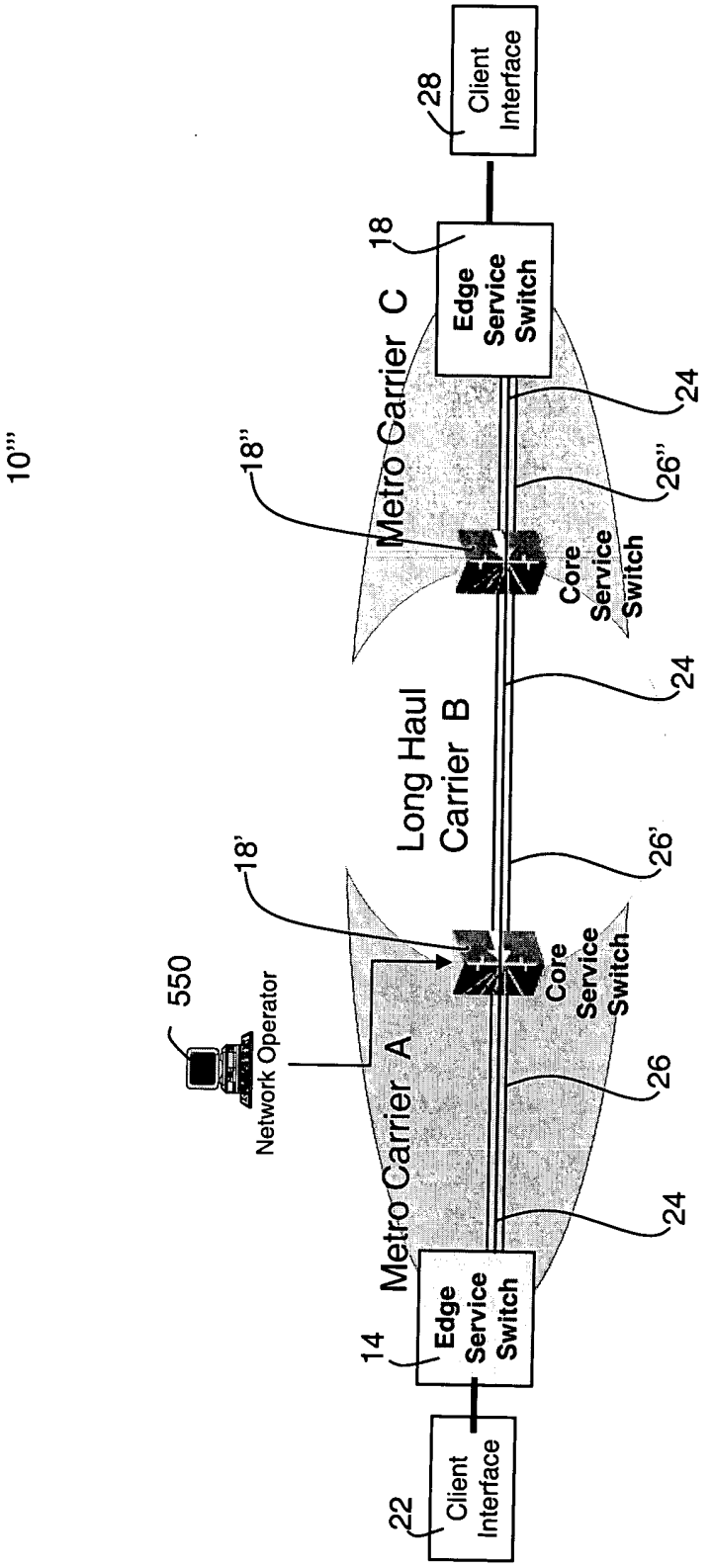
10'''
28
Client Interface
18
Edge Service Switch
Metro Carrier C
24
18''
26''
Core Service Switch
24
Long Haul Carrier B
18'
26'
550
Network Operator
Core Service Switch
Metro Carrier A
26
24
14
Edge Service Switch
22
Client Interface

FIG. 19

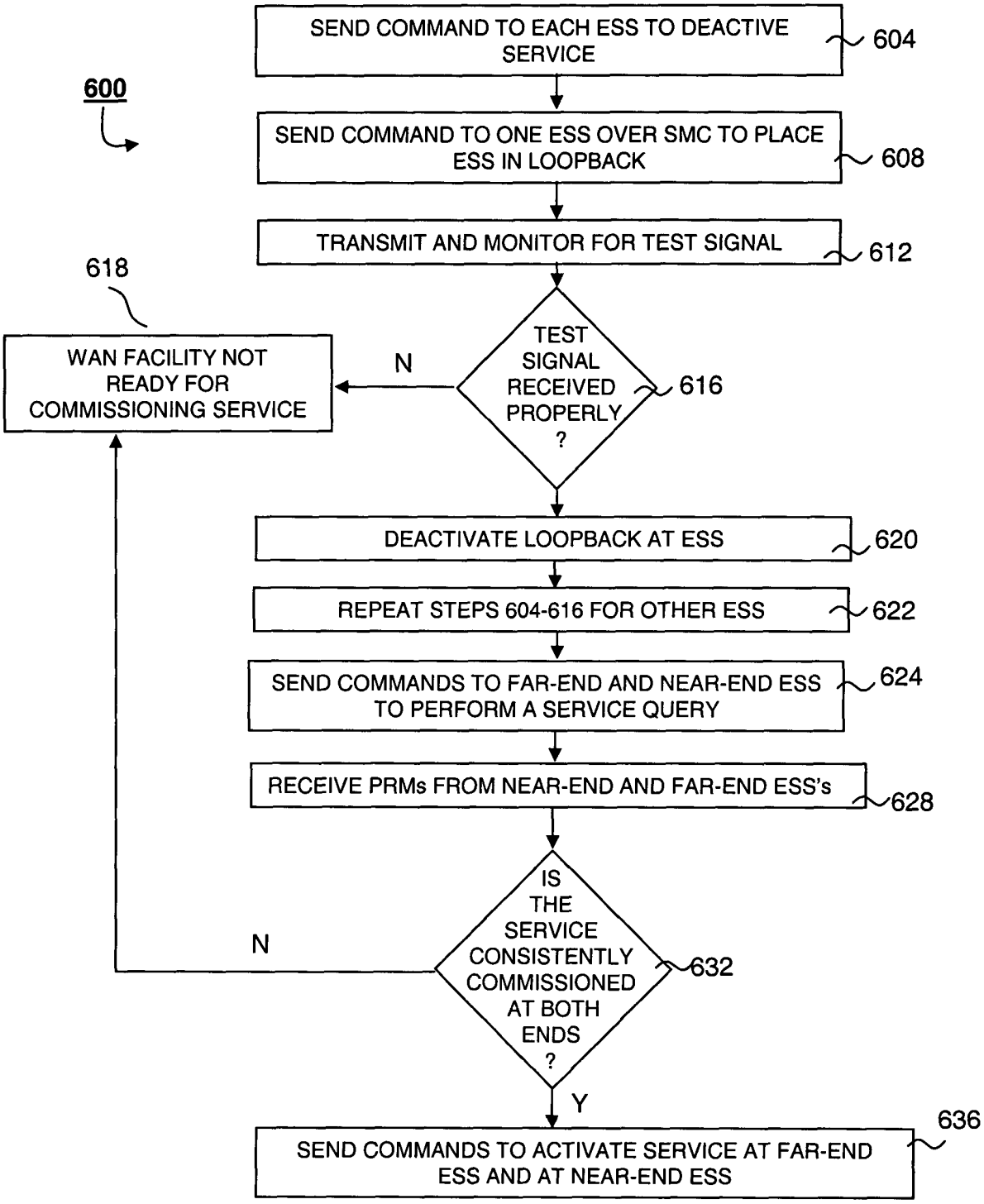
600
SEND COMMAND TO EACH ESS TO DEACTIVE SERVICE
604
SEND COMMAND TO ONE ESS OVER SMC TO PLACE ESS IN LOOPBACK
608
TRANSMIT AND MONITOR FOR TEST SIGNAL
612
TEST SIGNAL RECEIVED PROPERLY ?
616
N
618
WAN FACILITY NOT READY FOR COMMISSIONING SERVICE
DEACTIVATE LOOPBACK AT ESS
620
REPEAT STEPS 604-616 FOR OTHER ESS
622
SEND COMMANDS TO FAR-END AND NEAR-END ESS TO PERFORM A SERVICE QUERY
624
RECEIVE PRMs FROM NEAR-END AND FAR-END ESS's
628
IS THE SERVICE CONSISTENTLY COMMISSIONED AT BOTH ENDS ?
632
N
Y
SEND COMMANDS TO ACTIVATE SERVICE AT FAR-END ESS AND AT NEAR-END ESS
636

FIG. 20